# BITS
## computing&communications news

October-November 1998

COMPUTING, INFORMATION, AND COMMUNICATIONS (CIC) DIVISION • LOS ALAMOS NATIONAL LABORATORY

*Recently, laser beam energy deposition has been added to the RAGE code. This figure shows a 3-D calculation of a rectangular Trident laser beam ablating the surface of a plastic disk. For more information contact Erick Lindman (X-TA), 665-7519, <ell@lanl.gov>, or Vince Thomas (X-PA), 665-3672, <vat@lanl.gov>.*

## Inside this issue

## Customer Service Center . . . . . . . .(505) 665-4444
## or cichelp@lanl.gov

Because of the wide variety of CIC computing services, numerous facilities are available to address your questions. If you are uncertain whom to call, you can always call the Customer Service Center (CSC). CSC consultants are trained to either answer your question or locate someone who can. To reach the appropriate consultant, dial 665-4444 and make your selection from the following choices:

Option 1: New user topics including e-mail, passwords, registration, and World Wide Web.

Option 2: Labwide Systems such as Travel, Time and Effort, and Purchase Cards.

Option 3: Scientific computing, storage systems, and networking.

Option 4: Classroom instruction and training.

Option 5: Desktop Consulting for PC and Macintosh software and network configurations.

## Consulting Via E-Mail

Customer Service Center................................................................................cichelp@lanl.gov

Scientific and engineering computing...............................................................consult@lanl.gov

Administrative and business computing...........................................................labwide@lanl.gov

Passwords and registration.............................................................................validate@lanl.gov

Macintosh computing....................................................................................Mac-help@lanl.gov

PC computing.................................................................................................PC-help@lanl.gov

UNIX computing.........................................................................................UNIX-help@lanl.gov

## Other Useful Numbers

Advanced Computing Laboratory...............................................................................665-4530

Central Computing Facility.......................................................................................667-4584

Network Operations Center.............................................................noc@lanl.gov or 667-7423

Telephone Services Center.......................................................................................667-3400

# 24 Years Later, Bob Newell Joins the Lab as Deputy CIC Division Director

*BITS recently conducted an informal telephone interview with Bob Newell as he prepared to move his family to Los Alamos and begin his new job as CIC Deputy Division Director for Information Services.*

**What will your new job be?**

My job will be "CIO for the Lab," and by that I mean it will be my job to facilitate the Laboratory's communications, which comprise business computing, information systems, and communications.

**What parts of your work experience make you a particularly good match for this job?**

I have a strong scientific and engineering background, as well as years of managing information systems in business. So I will bring a business approach to the job in addition to my understanding of science and engineering.

Newell has a BS degree in electrical engineering from MIT and an MS degree in electrical engineering from Queen's University in Canada. He has been Manager of Information Systems for Basin Electric Power Cooperative in Bismarck, North Dakota, for the past 13 years.

**How did you hear of the opening in CIC-DO?**

From *Computer World* job ads.

**What attracted you to this job?**

Primarily the reputation of the Lab. (Aside: "I applied for an engineering job at the Lab in 1974, when it was still LASL, a few years after I had received my master's degree. I never even received an acknowledgment!)

**What is your impression of the division?**

I met an awful lot of really "cool" people. They're talented, they're going to be fun to work with, and the job is going to be very challenging. What more can you ask for?

**Of the Laboratory?**

It's more informal and low-key than I had anticipated, but no less intense. The intensity and drive and intellectual fervor matched up well with my expectations. I found it far less bureaucratic than the government ambiance I had expected.



*Bob Newell, CIC Deputy Division Director for Information Services.*

**What are you most looking forward to in your new position?**

The challenges firing me now are the intellectual ones: projects like Library Without Walls and the Xerox knowledge classification project. I'm also looking forward to the opportunity to get to know a lot of interesting people as the division's liaison with all parts of the Lab as we form partnerships in information-sharing.

**Where do you see your part of the division headed over the next two years?**

I view computers and information systems as enablers, not an end in themselves. That enabler over time has become more and more powerful, more and more complex. In fact information systems have become so complex that some people in the industry wonder if you can even deal with this complexity anymore. But I believe we can deal with the diverse web of computing resources available to us and use them to enhance

the enabling factor. We're on a historical continuum of ever-increasing dependence on computers. But as that dependence increases, so does the power of computers to enable science, business, and engineering, and there are plenty of new places for computing capabilities to go within those disciplines.

These are my own visions of where we go from here, which of course will be coordinated with the rest of the division management: (1) We will see Web delivery of applications through browser interfaces. We want to get away from the idea of touching the desktop. Web delivery of applications will also solve cross-platform problems with software. Three or four years from now we should be away from all that. The issue of interactive applications will eventually be solved. (2) The Library Without Walls concept is really in its infancy. The application of knowledge engineering, applying it to databases and so on is an area that I think we need to explore. Much more can be done, and the Lab can be in the forefront

of the development of these techniques. The Lab's partnership with Xerox is but one example.

**What was your first impression of Los Alamos?**

Los Alamos is definitely not Main Street USA! We were impressed by the intellectual atmosphere, excited about the school system, and dismayed by the cost of living.

**Can you tell BITS readers about your family and what you do outside of work?**

We have four grown boys and an 11-year old in the sixth grade. My wife and I enjoy tandem bicycling, and we cycle several thousand miles per year. I'm also a crossword puzzle nut.

*BITS welcomes Bob Newell to the Lab. We enjoyed his enthuiasm, and we look forward to working with him.*
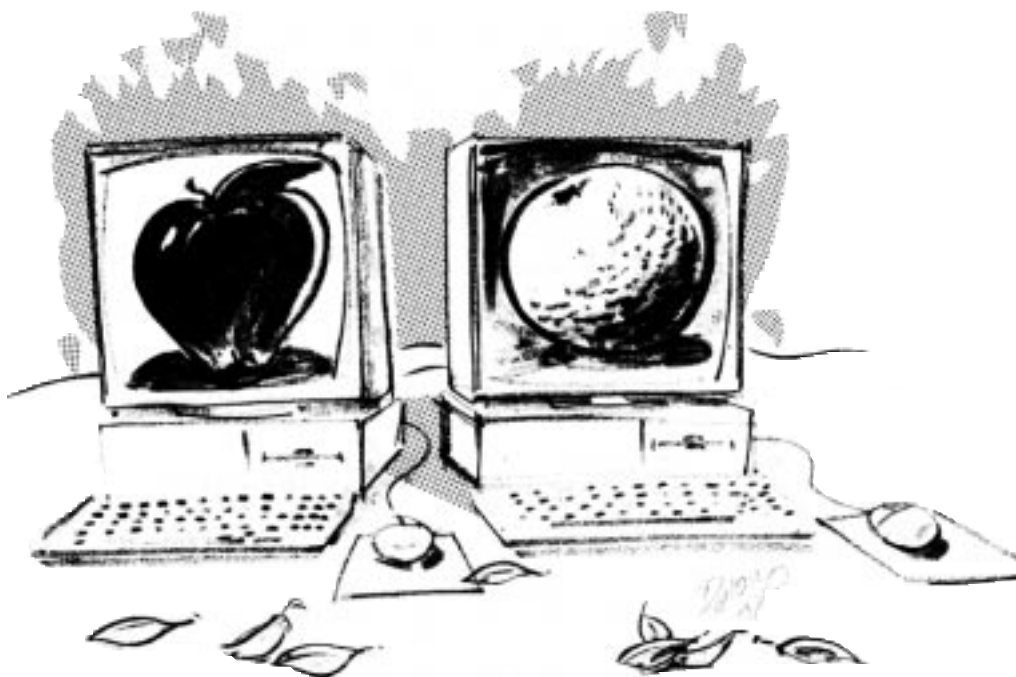


## And the Survey Says…

BITS subscribers submitted 260 completed surveys. Their replies will be tabulated, crunched, weighed, and pondered in deciding the future of BITS. Our sincere thanks to those who responded.

# CIC-10: "Knowledge Is Our Most Important Product"

*This article is one in a series of interviews BITS is conducting with CIC managers to get their views of the "big picture" as it relates to their work and the Laboratory mission. These people have also been asked to do a little forecasting as it applies to their business. BITS invites readers to join in the spirit of these interviews, treating the forecasts as a sort of informed speculation without holding anyone's "feet to the fire" to make the predictions come true.*

Let's say you're the team leader for a certain weapon system. It's summer 2001, and your team will soon be building a pit for that system. Just about everyone who's ever been associated with this particular weapon has retired. You need information that was originated from a number of sources, and it's in numerous formats with different indexing schemes. For example, you know that the Laboratory has taken over large number of records from Rocky Flats including fabrication and inspection procedures for this weapon. You know that the Laboratory also has engineering drawings of the pit components archived on aperture cards (see Figure 1) as well as other records scattered among perhaps a half dozen groups. Some of the information you need is contained in databases with different operating systems and software programs. You know also that CIC-9 made a "cradle-to-grave" documentary film of this particular weapon that shows the assembly and inspection of the weapon's pit at Rocky Flats years ago. You would like to be able to access all these records from your desktop, but you would also like to go to a central repository where you can review the actual historical materials.

When Earleen Eden, Group Leader of Group CIC-10-Information and Records Management, sees her plans come to fruition, CIC-10 will be able to provide its customers with all the necessary electronic records, indexed, linked to other useful records, and easily accessible. The user will not have to know which operating system or software was used to create these records. Access to hard-copy records will be simpler as well. The originals will be indexed and available at a new information research center staffed by knowledgeable people who can retrieve those records in real time. Records in both the on-line system and the repository for originals will be automatically protected by rigorous security protocols. These services will be provided to the entire Laboratory.
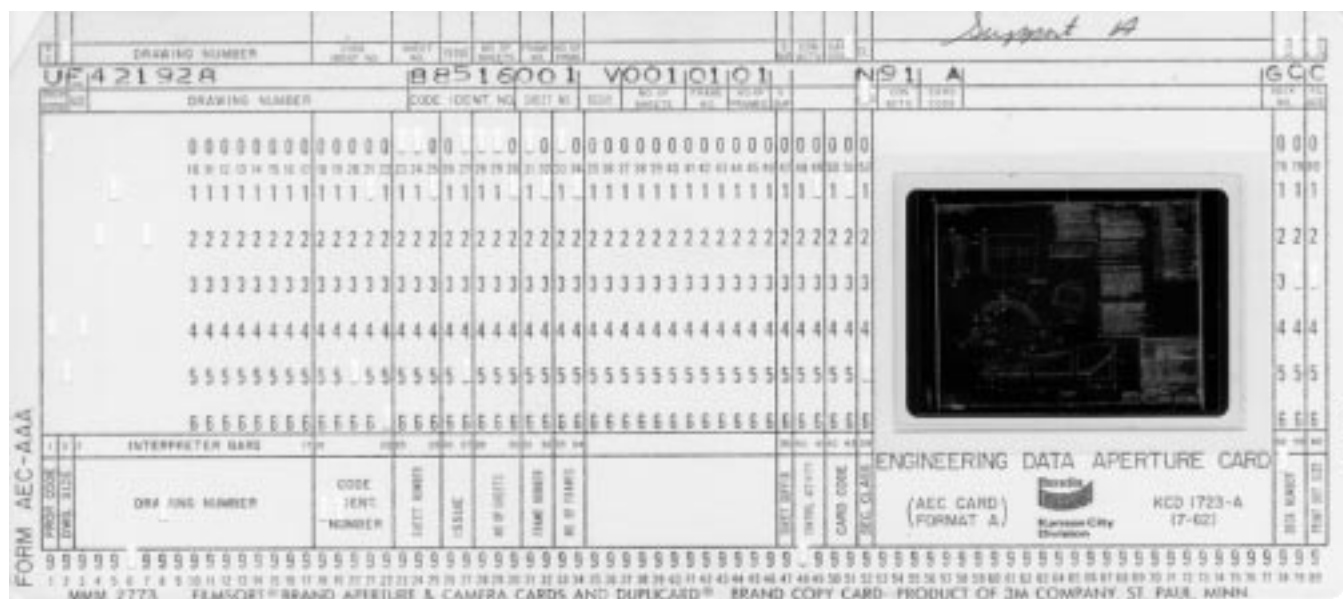


*Figure 1. According to CIC-10's major customers, the scanning and indexing of these aperture cards is a priority. The cards hold drawings that represent a wealth of information pertaining to LANL-developed nuclear weapons. The Laboratory holds more than one million of these cards, along with literally millions of other weapons-related records. The recently signed CRADA with Xerox seeks to organize these and other Laboratory records so that they can be accessed and used for the knowledge they contain.*

Eden says, "When I retire in about three years, I want to leave a good, solid foundation for the future of the Laboratory's information and records management. To do that, we must be able to understand and fill customers' needs." Customers include other members of the Department of Energy (DOE) complex as well as internal Laboratory customers. In fact the scattering of information is a major problem for DOE, so everyone is working toward solutions for better organization and retrieval of institutional knowledge. As missions shift among these institutions, fences are breaking down around "LANL turf," "LLNL turf," and "SNL turf." Eden explains, "We can't continue to operate as we have before; we must make weapons data accessible to each other within the DOE defense programs community. Each of these organizations has paper, data, film, and other materials that need to be indexed and retrievable, just as we do. In the end, the organizations that have the best information access system and the best tools will be best able to get their jobs done."

> *"In the end, the organizations that have the best information access system and the best tools will be best able to get their jobs done."*
> *—Earleen Eden*

### Records for Weapon Verification

The Laboratory is responsible for 85% of the weapons in the enduring stockpile. Records pertaining to those weapons are one-of-a-kind: log books, designs, test records, and much more. We can no longer depend on underground testing for new knowledge or verification of these weapons, so our records are essential to the mission. Providing organized, timely, one-stop access to these records is a challenge. CIC-10 and the Xerox Corporation believe that new technology and efficient operational processes will provide the answers to the challenge.

Xerox and the Laboratory have signed a cooperative research and development agreement (CRADA) to develop a knowledge-management system. The focus of the CRADA will be to develop software for the capture, organization, access, and reuse of data in such a way that knowledge can be gleaned from it. Advanced OCR/ICR (scanning) software and an automated approach to capturing metadata will support this focus. ("Metadata" describes aspects of actual data items, such as topic, format, originator, etc.) Presently, space in the old Shops Building (SM-39) is being readied to serve eventually as an information resource center.

Wayne Lundsford, ESA-WE, is a customer for the record storage systems that CIC-10 and Xerox are developing. He explains, "What I'd like, and I don't know if we'll ever get there, is to see people in our organization be able to access any document they need, on-line, no matter where it was originated, with rigorous need-to-know protocols in place. But I would settle for being able to go to a central vault to find whatever we have here and to be able to access data from other places without having to use different protocols and different passwords for each place." Lundsford adds, "What I need in a storage system is good configuration management. The production drawings we originate need to be easily retrievable, we need to know the number of the latest revision of a drawing, and we need to be able to find it." He recognizes that it's not just his organization but the Lab as a whole and the production plants as well that need good access to weapons data in order to do their jobs. "Cross-linkage is important even within the Laboratory;" he says. "We need to be able to access documents now in X-Division's vault and vice versa. Some of the Lab's most important data is what we're generating now, and we have no common system to store and access it."

Lundsford and others advised Xerox that weapons drawings are a priority, so the scanning and indexing of aperture cards will come first. An aperture (see Figure 2) usually contains the drawing of a part and its specifications; a list of other parts associated with it; all the notes that go with it; and the drawing's classification, revision number, and place in a series. Other apertures contain just text, e.g., storage requirements for a part, including its material(s), quality control specifications, cleaning procedures, and other process descriptions.

But it doesn't do any good just to scan and collect all the data. A good system must have a user-friendly index so that knowledge can be generated from the data. People developing the index have to know, for instance, what a production manager looks for in a drawing as well as what an engineer or designer looks for. A user needs to be able to discover how the information in one drawing relates to other drawings. Thus, for all the drawings being indexed and collected, CIC-10 has been working with subject-matter experts and

customers to plan the indexing. Eventually the new system will be both active and historical. As new information is generated, it also will be entered into the central system through processes to be developed under the CRADA.

### More than Weapons Records

Eden says regretfully, "As organizations and staffs change, the chain of ownership is broken. We have little assurance that we are maintaining our records as well as we should, yet they are so important to the legacy of the Laboratory." She continues, "We need a culture change marked by everyone understanding that records don't belong to an individual or division or group but to the institution. We have learned of cases where some people have taken their research records with them as personal property when they leave the Laboratory! Institutional records must be maintained for the next person who needs that information for their projects and programs."

Now that it is so easy to fire off an e-mail to an entire group or division, people no longer automatically send a copy to "Records" as they once did. To improve records management in today's environment, CIC-10 is piloting an "office automation system" to capture electronic records as they are generated. The pilot project involves the Director's Office first and then will expand to other division offices. Essentially a copy
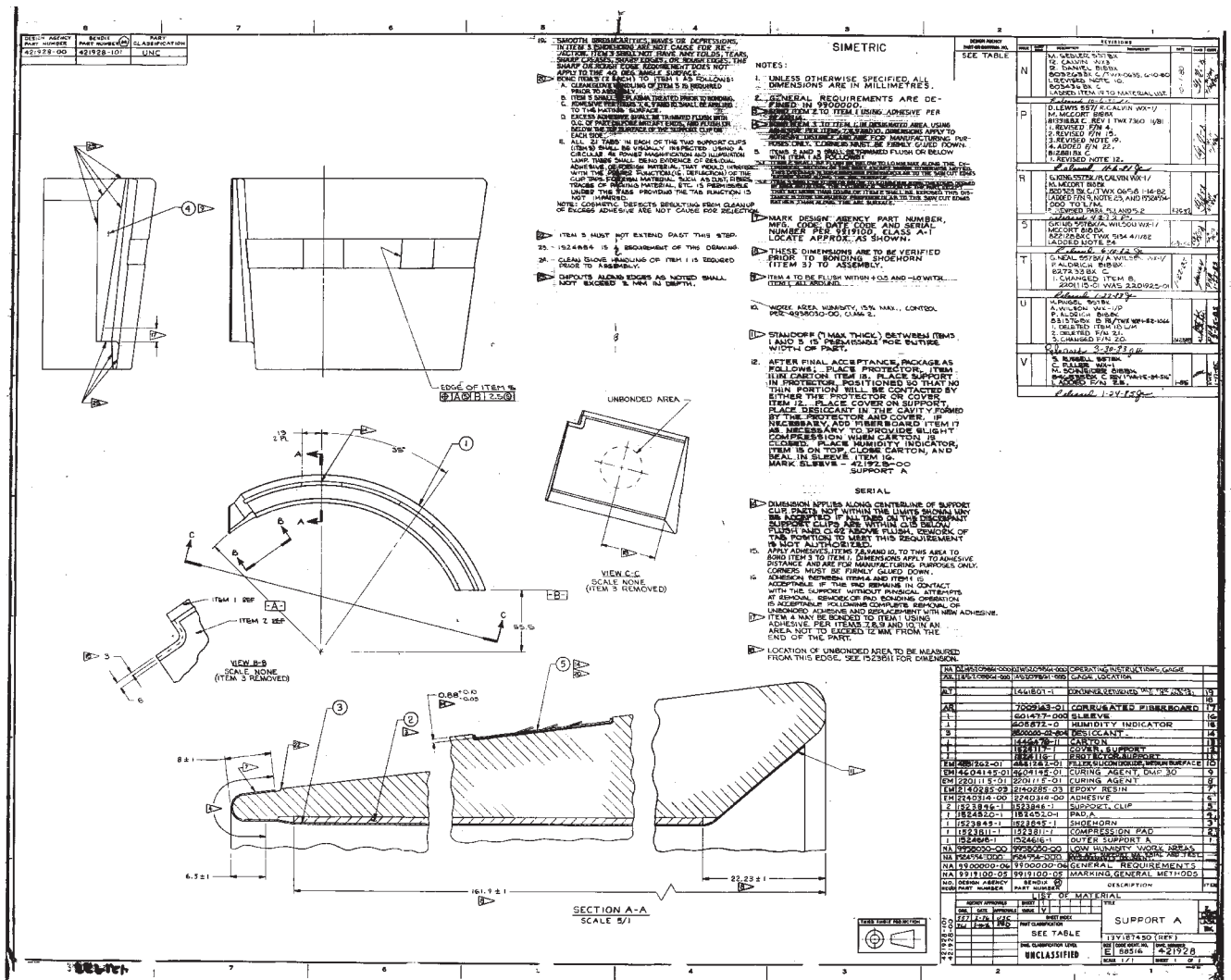


*Figure 2. Within an aperture there may be a drawing of a part and its specifications, as well as the drawing's classification, revision number, place in a series, what parts are associated with it, all the notes that go with the drawing, and more.*

of the communication goes into a repository, CIC-10 accesses it and decides whether to add it to the records collection, and, if so, indexes it. The originator doesn't have to remember to send "Records" a copy. If managing information this way proves to be valuable, the project will roll out to the whole Lab.

The Lab is also in its second year of a comprehensive, five-year program to inventory Laboratory records. By the end of the next four years, CIC-10 will have inventoried and indexed all the Laboratory's records, not just those for the weapons programs. Records inventories are in process or complete for APT, BUS, CMR, CST, EHS, and NMT Divisions. ESH Records Manager Sally Olguin reports, "When the CIC-10 Records Inventory Project Team came in and trained me to do a baseline inventory, they pushed us to a new level of records management."

Eden concludes, "We are entering an era where we will have a technology-driven way of doing business. Our staff will consist of customer-oriented people who understand how to use the technology and their knowledge of information management to provide customers with efficient access to information."

Eden joined the Lab in 1971 as a group secretary; soon after, she became a writer-editor. She then served as a group leader, project manager, deputy division leader, and project leader before becoming the CIC-10 group leader in November 1996. Earleen enjoys the outdoors: boating, skiing, and fishing in the summer and riding snowmobiles in the winter. Her special interests are reading and spending time with her four granddaughters.
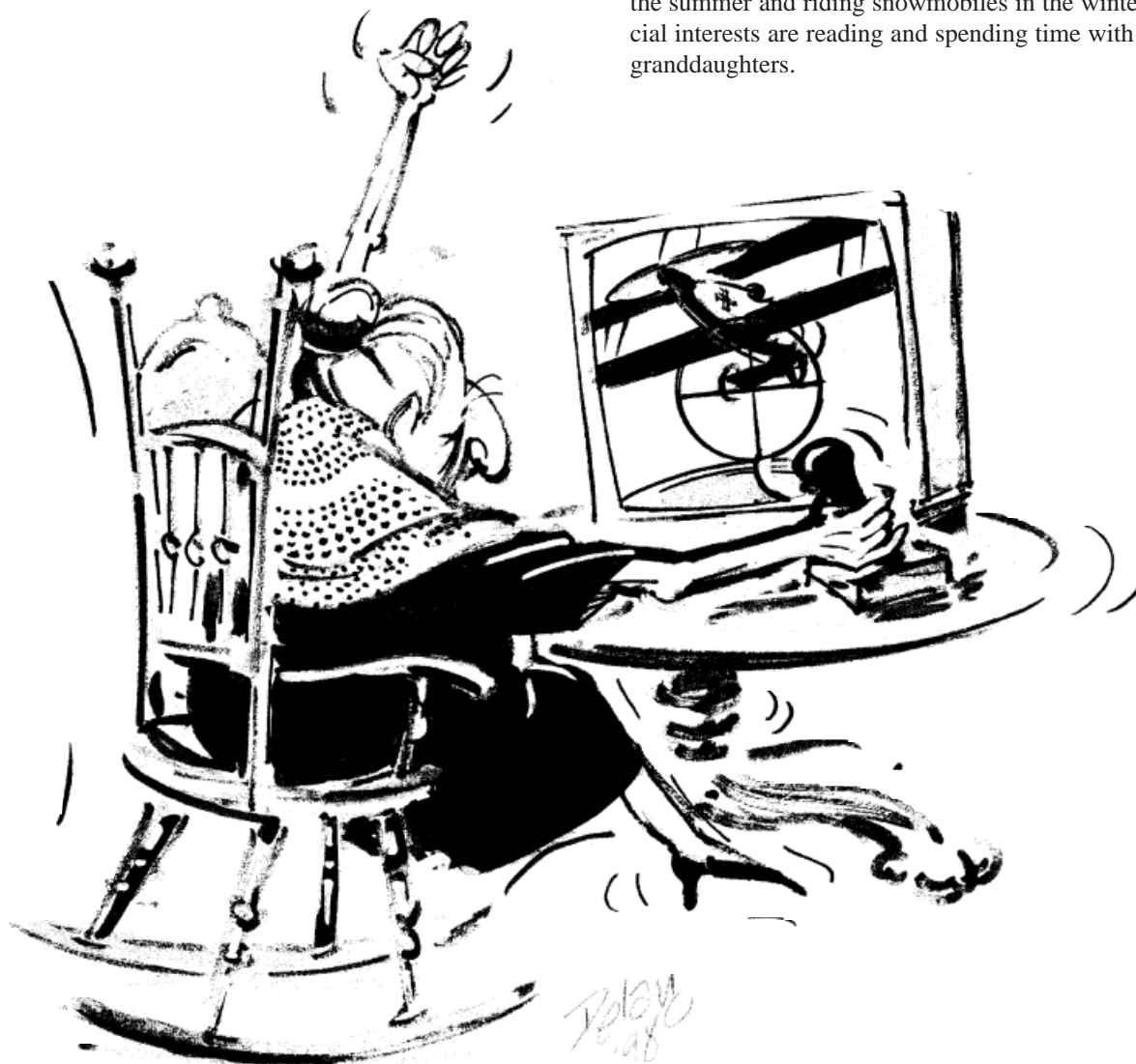
# It's Time for PNG: A Graphics Format You Can Pronounce

GIF (graphical image format) has served us well. It provided a good cross-platform image format...and led to ongoing discussions about its pronunciation. Sure the specification calls for a soft G as in "Jerry" instead of a hard G as in "Gary," but it's not the "Jrafical Image Format," and "JIF" sounds like a peanut butter. And so on.

PNG (Portable Network Graphics) has only one pronunciation: "Ping." Not "Pung." Not "Pinj." Which means, I suppose, that we'll have to figure out other things to disagree on.

A pronunciation we can agree on takes some of the fun out of it, but PNG has benefits to compensate:

- PNG, like JPEG (Joint Photographers Expert Group), is an open international standard without legal encumbrances. GIF, by contrast, is a proprietary standard with licensing requirements for its LZW (Limpel-Zev-Welch) compression algorithm. (The licensing affects tool developers, not Web authors.) Specifically, the PNG specification is a World Wide Web Consortium (W3C) Recommendation and has been issued as Internet Engineering Task Force (IETF) Information RFC (request for comment) number 2083.

- PNG offers "lossless" compression, keeping all of the detail of the original image. JPEG, by contrast, is "lossy," leading to fuzzy edges and banding. GIF is lossless, but its palette is limited to 256 colors.

- PNG supports up to a 48-bit "truecolor" "colorspace" (trillions of colors). JPEG supports up to 24-bit color (16 million colors), while GIF is limited to 8-bit color (256 colors). PNG and JPEG both go well beyond the limitations of most monitors (typically 16 bit), while GIF images can appear noticeably spotty.

- PNG supports palette colorspace of 1 to 8 bits (2 to 256 colors), gray scale colorspaces of 1 to 16 bits (2 to 65 thousand colors), and truecolor colorspaces of 24 and 48 bits (millions and trillions of colors). JPEG supports only 8-bit gray scale and 24-bit truecolor, while GIF supports only 1- to 8-bit palettes. PNG gives us greater flexibility in choosing the colorspace best suited to a particular image.

- PNG supports interlacing and variable transparency (in PNG, a pixel can be 85% transparent). "Progressive JPEG" is similar to interlacing (a fuzzy image appears quickly and resolves into the clearer image as the rest of the file is loaded), but JPEG does not support transparency. GIF supports interlacing and transparency, but not variable transparency. Note, however, that PNG transparency is only available for colorspaces of more than 8 bits.

- PNG includes gamma information so that images can be adjusted to appear the same on different platforms. Neither JPEG nor GIF do.

- PNG is Year 63,000 compliant.



*Figure 1. Photograph of an old Irish promontory fort. This photo is used to compare the use of PNG, JPEG, and GIF graphics formats.*

There are more features as well—such as file integrity checks and extensions—but the above is enough to show that PNG is a truly flexible format.

The flip side of flexibility is ease of abuse, in terms of using the format both at the wrong time and in the wrong way. What this article focuses on is how to take advantage of the flexibility while avoiding common problems.

### When to Use PNG

For starters, PNG is a raster format, like JPEG and GIF. It defines an image as pixels (dots) instead of as mathematical equations used in vector formats. This means, that like JPEG and GIF, it is well suited for most Web graphics that are primarily intended for on-line viewing, but it does not resize particularly well and is not as well suited for high-quality images as PDF (portable document format) using vector graphics.

PNG is also intended for static images, not animation. Work is being done on some PNG-based animation specifications, but those aren't part of PNG itself.

PNG is currently supported in-line by Netscape Navigator 4.04 and higher and Microsoft Internet Explorer 4.0 and higher (albeit with some glitches). For older versions and other browsers, there are plug-ins, but those aren't the same as true in-line support.

Hence, the audience becomes the initial consideration. If we can reasonably assume that our audience will be using up-to-date browsers, then PNG may be the format to use. If, however, we are building a public Web space to serve a global audience, then we cannot make that assumption and are better off either sticking to JPEG and GIF or using PNG but offering an alternative for non-PNG browsers. (See below for a discussion of ways to offer PNG alternatives.)

The next round of considerations involve the image itself:

- Is the image line art or photorealistic? For line art (including text), PNG offers all the technical benefits of GIF (sharp edges, etc.) and is generally preferable to JPEG. For photorealistic images, either PNG or JPEG may be preferable.

- How important is image quality? PNG offers better-quality images, without the fuzziness introduced by JPEG's lossy compression. JPEG's fuzziness, however, can be barely noticeable for many photorealistic images.

- How important is file size? For line art, PNG files are generally smaller than JPEG. For photorealistic images, JPEGs are generally smaller than PNG.

- How important are PNG's advanced features such as gamma correction and variable transparency? In some cases, PNG may be the only acceptable option.

Balancing the above considerations can lead to various combinations. PNG can be used for some images, JPEG for others; or JPEG thumbnails might be linked to larger, higher-quality PNGs.

### Offering Alternatives to PNG

The easiest way to offer an alternative to a PNG image is to use the "ALT=" attribute to provide a description of the image. This will take care of not only older browsers that do not support PNG but also browsers with in-line images turned off and nongraphical browsers such as voice synthesizers. If desired, a link can also be provided to a GIF or JPEG version of the image for users who wish to follow it.

A second way to offer an alternative is to use a script such as the following, which tests the browser version and returns a PNG image ("image.png") for Netscape 4.04+ or MSIE 4+, a GIF image ("image.gif") for other script-capable browsers, and a GIF image for browsers that do not support scripts:

## Some LANL Web Stats

Using the Compass search tool, it can be determined that as of September 7, 1998, the LANL Web comprised at least 187,000 pages on 275 servers. The complete breakdown can be seen at <http://w5.lanl.gov:9051/sites.html>. According to a group of LANL Web gurus who are trying to implement Yahoo-style categories for LANL, there are roughly 5000 central "sites" on the LANL Web.

The "hits" on the main LANL Web site <www.lanl.gov> have more than doubled in the last two years from ~200,000 each week in fall 1996 to ~450,000 each week at the present.

*James Mottonen, CIC-8 Web Team, 667-1660, mottonen@lanl.gov .*

```
<SCRIPT LANGUAGE="JavaScript">

<!—

var browser = navigator.appName;

var version = checkvers();


function checkvers() {

  return parseFloat(navigator.appVersion)

}

 if (((browser == "Netscape") && (version
>= 4.03)) ||

   ((browser == "Microsoft Internet
Explorer") \&& (version >= 4))) {

   document.write("<img
src='image.png'>");

 }

 else {

   document.write("<img
src='image.gif'>");

 }

 // —>

 </SCRIPT>

 <NOSCRIPT>

 <img src="image.gif">

 </NOSCRIPT>
```

Note that the above test is limited, in that there are a number of other browsers that also support PNG. A more thorough test would include Amaya 1+, NCSA X Mosaic 2.7+, XEmacs 19.14+, and a score or so of other browsers, which can quickly add a lot of code for each image.

Content negotiation offers a more elegant solution if the server software supports it. Basically, browsers can send information about content they prefer as part of the header of each request. If the server sees "Accept: image/png" or "Accept: image/x-png", it can serve up a page with PNG images; if not, it can serve up a page with GIF images. For details on content negotiation, consult your system administrator or server software documentation.

## How to Use PNG

Once we have decided that PNG is a valid option for a particular image, the trick becomes using it in a way that takes advantage of its strengths and capabilities. As with JPEG and GIF images, the default options that an image editor offers are not necessarily the best for a particular image, so testing and comparing are often needed to find the best combination.

Among the issues to consider are the following:

• Never use uncompressed PNGs (well, almost never. No image quality is lost in compression, but file sizes and transfer times are considerably reduced. For example, the image used to test compression in Willem van Shaik's PNG Image Test Suite compresses roughly 93% at the default compression setting. More typical ranges, according to the "zlib" documentation and personal experience, are 50%–80%. Furthermore, the PNG compression is asymmetric—requiring more time to compress but less time to decompress—so that the time required to display an image is minimized. Given these benefits, about the only use for uncompressed images is for purposes of comparison.
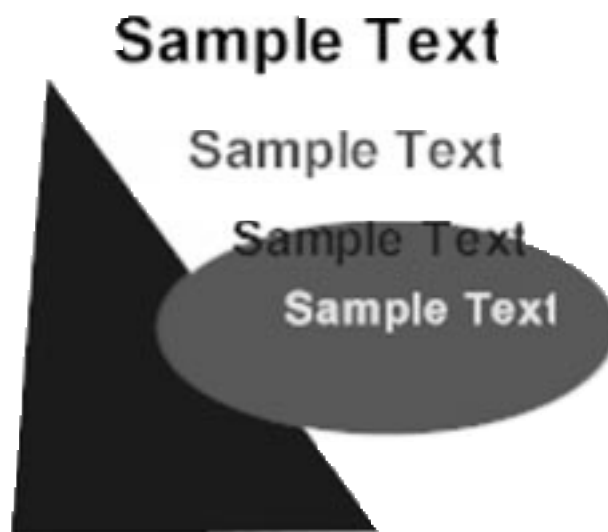


*Figure 2. Example of line art used to compare the use of PNG, JPEG, and GIF formats.*

- Consider different compression levels. The PNG specification calls for 10 levels of compression, ranging from level 0 (no compression) to level 9 (maximum compression). This frequently has little effect on image size (for example, the van Shaik image mentioned above compresses 92.68% at level 3 and 92.93% at level 9), but sometimes the file sizes will vary more, and the lower the level, the faster the decompression. The best here is to simply test and compare.

- Generally use filtering. PNG filtering rearranges the bytes in an image before it is compressed in order to optimize the compression. Filtering generally works best for truecolor images, and I've generally found it to reduce file sizes by about 25% for such images (though an extreme example from the PNG Home Page demonstrates a 300-fold improvement with filtering). Tests by the W3C have shown, though, that filtering has little value for images with 256 or fewer colors.

- When possible, choose larger combined images over multiple smaller images. Each PNG file includes a header that is larger than the header on, for example, a comparable GIF file. When multiple images can be combined into a single image (for example, in a navigation bar), the single image will generally be smaller than the multiple images (because it only requires one header), and performance will be further improved because only one HTTP call is needed.

- Do consider gamma information and interlacing. Both of these add slightly to file sizes, but both offer benefits. Images tend to appear lighter on a Macintosh than on a PC or UNIX machine as a result of different default gamma settings for the monitors, with the differences compounded by the fact that the human eye becomes more sensitive to differences in hue as colors become brighter. (What looks blue on a PC can turn purple on a Mac.) Including gamma information in a PNG image can compensate for this by enabling the machine that is viewing the image to correct its display. A PNG image with gamma included can look the same on all platforms.

Interlacing enables the image to "fade in" beginning with as little as 1/64th of a PNG file. As the rest of the file loads, it becomes clearer. The benefit here is that users get a chance to see what an image is as quickly as possible. If the image looks interesting to them, they can wait for the rest to download; but if not, they can stop the download without needing to wait for the full image.

## Examples

In the "Information Architecture White Paper IA-6801: Electronic Image Formats and Compression Algorithms," we offer several examples of images using PNG, JPEG, and GIF. The first (Figure 1), a photograph of an old Irish promontory fort, yields the following file sizes, along with my personal assessment of the quality of the images:

PNG, unfiltered truecolor—117,088 bytes—best quality

PNG, filtered truecolor—86,938 bytes—best quality

PNG, 256-color palette—33,280 bytes—good quality

PNG, 64-color palette—22,047 bytes—moderate quality

JPEG, 11% compression—12,374 bytes—good quality

JPEG, 25% compression—7,578 bytes—good quality

JPEG, 50% compression—5,168 bytes—moderate quality

GIF, 216-color undithered—13,701 bytes—low quality

GIF, 216-color dithered—19,298 bytes—moderate quality

GIF, 16-color undithered—9,342 bytes—low quality

GIF, 16-color dithered—14,220 bytes—low quality

For an example such as the above, JPEG with 25% compression would be the best choice if good quality is acceptable, while the filtered truecolor PNG would be the best choice if high quality is desired.

Note that a 216-color palette is an 8-bit, 256-color palette that is restricted to the 216 colors that Netscape displays on 256-color monitors. The colorspace is the same bit depth; there're just some colors missing.

The second example image (Figure 2) is of line art including colored geometric shapes and lettering. The resulting file sizes and quality are as follows:

PNG, unfiltered truecolor—8,347 bytes—best quality

PNG, 216-color palette—3,415 bytes—best quality

JPEG, 10% compression—10,041 bytes—moderate quality

JPEG, 25% compression—6,797 bytes—low quality

JPEG, 50% compression—5,005 bytes—low quality

GIF, 216-color palette—3,912 bytes—best quality

GIF, 16-color palette—2,632 bytes—low quality

In this example, the 216-color PNG offers both the best quality and the smallest file size.

### For More Information

For links to further information about PNG, please see our IA General Web Activity Area page at <http://www.lanl.gov/projects/ia-lanl/area/web/>. For more information on effective use of images (including general tips such as using WIDTH and HEIGHT attributes), please see the two BITS articles on "Images on the Web" (August

and September 1996) and the IA White Paper IA-6801: Electronic Image Formats and Compression Algorithms at <http://www.lanl.gov/projects/ia/stds/ia680111.html>.

For more information about the IA in general, please visit our project home page at <http://www.lanl.gov/projects/ia/>. If you need printed or e-mail copies of any of the IA materials, please contact me via the information given below.

*Tad Lane, CIC-1, 505-667-0886, tad@lanl.gov*
*http://www.lanl.gov/projects/ia/staff/tad.html*

*Information Architecture Standards Editor*
*http://www.lanl.gov/projects/ia/*

*IA Internet/WWW Subject Area Champion*
*http://www.lanl.gov/projects/ia-lanl/area/web/*

# PS Awards LANL Web

*Popular Science* has named Los Alamos National Laboratory as one of the magazine's "50 Best of the Web" for 1998. In congratulating the Laboratory, the magazine said, "The editors of *Popular Science* commend you on your fine work in making science and technology such a vibrant part of the World Wide Web." Accompanying the Laboratory in the top 50, sci-tech-lab catetory, are the MIT Media Lab, Bell Labs Innovations, Sandia National Laboratories, and IBM Research.

For the past three years the magazine's monthly "Web Watch" column has included a list of Internet sites that impress its editors. The annual award is an extension of that column's editorial coverage. Award-winning sites were featured in a special, eight-page section in the September issue.

The magazine's listing of best sci-tech Web sites appears at <http://www.popsci.com/context/features/bow/white_coats.html> with a direct link to the LANL internal home page. We're at the top of a list called "White Coats 'R US," and the caption under our link says, "Birthplace of the Bomb, Los Alamos continues to work on nuclear weapons and materials. This one glows." (Groan.)

# Research Library Training

The LANL Research Library offers a variety of training opportunities for the Laboratory community. Sessions focus on specialized library databases and other electronic resources. While the sessions listed below will be held at the library, training can be arranged at your site. Contact the Library by phone at 7-4175 or by e-mail to  HYPERLINK mailto:library@lanl.gov library@lanl.gov, to register for a session or to arrange a special session/training at your site.

| Date | Time | Subject Matter |
| --- | --- | --- |
| 11/4/98 | 1:00-1:30 | Research Library Tour |
| 11/4/98 | 1:30-2:00 | Introduction to Electronic Library Resources |
| 11/10/98 | 10:00-10:30 | Business Resources on the Web |
| 11/17/98 | 1:00-1:30 | Federal Regulations on the Internet |
| 11/18/98 | 1:00-1:30 | Research Library Tour |
| 11/18/98 | 1:30-2:00 | Finding Addresses and Phone Numbers on the WWW |
| 11/19/98 | 2:00-4:00 | InfoSurfing: Basic Web Searching Strategies |
| 12/1/98 | 2:00-2:30 | MELVYL (U of CA specialized databases) |
| 12/2/98 | 1:00-1:30 | Research Library Tour |
| 12/2/98 | 1:30-2:00 | Introduction to Electronic Library Resources |
| 12/3/98 | 1:00-1:30 | SciSearchÆ at LANL |
| 12/15/98 | 11:00-11:30 | Earth Sciences Web Resources |
| 12/16/98 | 1:00-1:30 | Research Library Tour |

Watch the Library's training Web page, <http://lib-www.lanl.gov/libinfo/training.htm> for the addition of classes on Engineering IndexÆ. This new database is scheduled for a November release.

# Computer Training

The Customer Service Group (CIC-6) offers technical computer training (enterprise information applications, communications, office administration, and Web authoring) and advanced technical computer training (programming languages, system administration, and advanced applications). To register for a course access our Web page at

http://www.lanl.gov/cic/cic6/training.html

Or from the LANL home page select the links: Training, Computer. For further information about technical computer training call (505) 667-9559, and for advanced technical computer training call (505) 667-9399.

**Communications**
  Eudora 4.02
  Lotus Notes 4.5x
  Meeting Maker 5.0.3

**Office Skills 2000**
  Office Skills 2000  LANL Computing
  Office Skills 2000  Professional Development

**Web Authoring and Browsing**
  FrontPage 98
  HTML Basics
  HTML Intermediate
  Netscape 4.0

**Coming Soon**
  Directory Information System (DIS)  Web
  Procurement Desktop
  Recharge

**Enterprise Information Applications (EIA)**
  Date Warehouse - Basics
  Date Warehouse  EDS Reports
  EDS  Basics
  EDS  Training Plans
  Foreign Travel GUI
  Infomaker
  Invoice Approval System
  Purchase Card System
  Time & Effort GUI
  Travel GUI
  Web JIT

**Other EIA Courses**
  Financial Management Information System (FMIS)
  Property Accounting, Inventory and Reporting
        System (PAIRS)
  Signature Authority System (SAS)
  Secretarial/Contract Services (SE)
  Salary Review System (SRS)
  Directory Information System (DIS)
  Automated Chemical Information System (ACIS)

**Application Training**
  Advanced WWW Development
  FrameMaker Basic & Advanced
  Foundations of IDL Programming
  IDL 5.0 Graphic Object Workshop
  Netscape Servers for Intranet Development
  Origin2000 Applications Programming and Optimization
  Running on the ASCI Blue Mountain Systems
  Sendmail/Managing Internet Mail
  C++ and the Unified Modeling Language
  Sybase Performance and Tuning for System 11
   Sybase SQL Server Administration
  Unix (Beginning)
  Unix (Advanced)
  Visual Basic 5.0 Fundamentals
  Visual C++ Windows Programming

**Programming Training**
  C Programming (Beginning)
  C Programming (Advanced)
  C++ for Experienced C Programmers
  ANSI/ISO C++ Programming Clinic (Advanced C++)
  Java Programming
  Java  Programming Workshop
  Distributed Programming With Java
  Object Technology: A Management Overview
  Object-Oriented Analysis and Design
  Perl Programming
  C-Shell Programming

**System Administration Training**
  SGI System Administration (Beginning)
  SGI System Administration (Advanced)
  SGI Network Administration
  SGI Performance Evaluation and System Tuning
  Solaris 2.X System Administration
  Solaris 2.X Network Administration
  Solaris 2.X Server Administration
  Unix and Windows NT Integration
  Windows NT Workstation and Server
  Windows NT Optimization and Troubleshooting
  Windows NT Security

Los Alamos
National Laboratory

# INTEGRATED COMPUTING NETWORK (ICN) VALIDATION REQUEST

**Instructions:**

(1) Complete all parts of this form that apply to you. Please take note of the "Special Requirements" section and complete any applicable parts.

(2) Manager (Group Leader or above) authorization and signature are required for all validation requests.

(3) Before submitting this request, ensure that your Employee Information System (EIS) information is current.

(4) Once completed, either mail this request to the Password Office at MS-B251, fax it to (505) 667-9617, or, if you are cleared, handcarry it to TA-3, SM-200, Room 257.

If you have **questions** call (505) 665-1805 or send e-mail to validate@lanl.gov

## Owner Information

| Z-Number (if you have one) | | Name (last, first, middle initial) |
|---|---|---|
| LANL Group | Phone Number | LANL Mail Stop | Citizenship (Foreign National see "Special Requirements-Foreign National") |

**Check LANL affiliation:**

☐ LANL employee

☐ Contractor _____
   (specify contract company)

☐ External user_____
   (specify employer)

☐ Other (specify)_____

Send password / smartcard to:

☐ Mail Stop    or    ☐ Mail to address indicated below

Name / Organization

Address

City, State, Zip Code

## Access   Check access method and needed partitions:

**Access method:**    ☐ ICN Password    ☐ Smartcard    ☐ Both

☐ **Open** partition (e.g., open machines, or for dial up access )

☐ **Administrative** partition (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS] )
If you are not a cleared LANL employee, see required steps in section "Special Requirements-Administrative Partition".

☐ **Secure** partition (i.e., secure machines )
A Q-clearance is required for secure access. After obtaining Manager signature for Secure access, handcarry this form to the Password Office to obtain your Secure account.

I certify this person does require **secure** access:

_____  _____
Manager Signature    (Group Leader or above)       Date

Password Office Use Only

| New    Change | Clearance Status | Processed | Lv | Smartcard Serial # |
|---|---|---|---|---|
| ☐    ☐ | | | | |
| Comments: | | | | |

Form 1646 (3/95)   Supersedes previous versions (rev. 4/97).

Continue ➘

cut along dashed line

## Special Requirements

### Administrative Partition
Lab-Wide Systems (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS])

☐ **Under 18 years of age** — If you need to access Administrative systems, your Group Leader must provide a memo accepting responsibility for your actions and justifying your need for access. This memo is to accompany all forms taken to the security briefing (see "Contractor or Non-Cleared" section below. You may not access the Secure Partition.

☐ **Contractor or Non-Cleared**

Phone (505) 665-4444 (option #2) to obtain Access Authorization packet.

Phone (505) 667-9153 to schedule a security briefing.

Bring all forms including this ICN Validation Request to the security briefing for approval.

| CIC-6 Security Briefing Approval Signature | Date |
|---|---|
|  |  |

---

☐ **Foreign National**

Attach a copy of Form 982 (REQUEST FOR UNCLASSIFIED VISIT OR ASSIGNMENT BY A FOREIGN NATIONAL) with all approval signatures. Be sure Box #11 of Form 982 is completed. If you are not a visitor/assignee under a LANL/DOE approved Visit / Assignment Request, attach written justification from your host Group Leader or Division Director describing your need to access the ICN.

---

## Authorization (required)

| Print Manager Name (Group Leader or above) | Manager Z-Number | Group |
|---|---|---|
|  |  |  |
| Manager Signature (Group Leader or above) | Mail Stop | Date |
|  |  |  |

If you are NOT a LANL employee you must have a LANL contact and obtain the contact's signature in addition to the contact's manager's signature.

**LANL contact: Read the following and sign below.**

By signing this form I affirm that I understand and accept the following:

a. I am a regular Laboratory employee.

b. I am responsible for forwarding password reauthorizations and verifying annual account reauthorizations for this user.

c. I am responsible for notifying the Password Office within 10 days of changes in my status.

d. I am responsible for notifying the Password Office immediately of changes in this user's status (termination, end of contract, etc.).

| Print LANL Contact Name | Contact Z-Number | Phone Number | Group |
|---|---|---|---|
|  |  |  |  |
| LANL Contact Signature |  | Mail Stop | Date |
|  |  |  |  |

NOTE: All Laboratory computers, computing systems, and their associated communication systems are for official business only. By completing this validation request and signing for a password and/or smartcard, you agree not to misuse the ICN. The Laboratory has the responsibility and authority to periodically audit user files.

# Reader Feedback

Feedback helps us to provide a document that responds to the changing needs of its readership. If you have comments or questions about this publication, please let us hear from you. We have reserved the back of this form for that purpose. We also accept articles for publication that are of interest to our readers. Contact the managing editor for more information. This form is also used for new subscriptions, deletions, or changes. Instructions are on the back. If you prefer to contact us by e-mail, send your comments and/or subscription request to mauzy@lanl.gov.

# Feedback

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

## New Subscriptions, Deletions, and Changes

**BITS** is published by Los Alamos National Laboratory. If you would like to be added to or deleted from our mailing list, please check the appropriate line, complete the form below, and mail us the form.

_____ Add my name to the **BITS** mailing list.

_____ Delete my name from the **BITS** mailing list.

_____ Change my name/address as indicated below.

| Name | | Date |
|---|---|---|
| Address | | Mail Stop |
| Group | Organization | |
| City | State | Zip |
| Phone | Number of copies | Employee Z# |

# INDEX

**Los Alamos**
NATIONAL LABORATORY

# Los Alamos

**NATIONAL LABORATORY**

Los Alamos, New Mexico 87545

BITS is published bi-monthly to highlight recent computing
and communications activities within the Laboratory.
We welcome your suggestions and contributions.

BITS can be accessed electronically via the following URL:

**http://www.lanl.gov/cic/publications.html**

LALP-98-28 (10-98)